

Manitoba Health

Annual Influenza Report, 2012/2013

July 1, 2012 – June 30, 2013

Public Health

Public Health and Primary Health
Care Division

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EXECUTIVE SUMMARY

Seasonal influenza can cause severe morbidity and mortality, especially in those vulnerable populations at the extremes of life.

Influenza is a reportable disease under the *Public Health Act* of Manitoba and routine monitoring of influenza is performed by Manitoba Health through a variety of mechanisms. Although the typical North American influenza season usually occurs in late fall/winter, the emergence of novel strains and proliferations in global air travel have led to influenza infections being observed outside of the typical months.

A variety of data sources are used and surveillance indicators evaluated together in order to gain an understanding of influenza disease in the province of Manitoba. These surveillance data are utilized to identify and monitor the arrival of influenza, its geographic spread, intensity of activity, characteristics of those infected, as well as severity and changing trends in order to guide prevention and control recommendations. Routine surveillance also serves to create an expected baseline that allows for the detection of significant changes in activity/trends.

The purpose of this report is to present an overview of the 2012/2013 influenza season in Manitoba.

INTRODUCTION

The following report details influenza activity in Manitoba for the 2012/2013 flu season (July 1, 2012 to June 30, 2013). The Epidemiology and Surveillance (E&S) unit of the Public Health Branch of Manitoba Health received its first laboratory-confirmed positive case of influenza for the season during the week of September 2-8, 2012. This flu season in Manitoba, there were **688** lab-confirmed cases of influenza reported, of which **578** were influenza A and **110** were influenza B. Overall:

- The season peaked in January, 2013 which is comparable to previous influenza seasons
- Over three-quarters of all laboratory-confirmed cases were typed as influenza A in contrast to last season where more cases of influenza B were reported
- There were 152 hospitalizations associated with a laboratory report of influenza, of which 25 resulted in an ICU admission. There were nine deaths in individuals with a positive laboratory report of influenza
- The number of laboratory-confirmed influenza outbreaks (n=46) was greater than what was observed in previous influenza seasons
- Influenza vaccine uptake was comparable to what was observed in previous seasons (20% of the population)
- The incidence rate of AEFI reports related to the seasonal influenza vaccine was slightly higher (19.8 per 100,000 individuals vaccinated) than last season (17.1 per 100,000 individuals vaccinated).
- National strain characterization results provide evidence that the seasonal trivalent influenza vaccine provided protection against the circulating strains of the influenza A and B viruses.

METHODOLOGY/DATA SOURCES

Epidemiology and Surveillance at Manitoba Health works with partners at the local, provincial, and national level to monitor influenza activity in the province. Methods used to conduct surveillance are explained in detail below and include:

- A. Syndromic surveillance
 - a. Sentinel surveillance of influenza-like illness (ILI) in the community
 - b. Respiratory-related calls to Health Links/ Info Santé
- B. Laboratory reporting of confirmed influenza infections
- C. Reports of hospitalizations, ICU admissions, and deaths of individuals with influenza
- D. Reports of influenza outbreaks
- E. Influenza vaccination including vaccine uptake, adverse events following immunization, and vaccine effectiveness
- F. Influenza antiviral distribution and dispensing
- G. Influenza strain characterization and antiviral resistance

A. Syndromic Surveillance

a. Sentinel surveillance of ILI in the community

FluWatch is Canada's national surveillance system that monitors the spread of flu and flu-like illnesses on an on-going basis. The *FluWatch* program consists of a network of labs, hospitals, doctor's offices and provincial and territorial ministries of health.

Manitoba participates in *FluWatch*, which is co-ordinated by the Public Health Agency of Canada (PHAC). In addition to lab-confirmation of influenza, this program relies on weekly reports of influenza-like illness (ILI) as reported by 24 sentinel physicians reflecting all five regional health authorities (as of July 4, 2013): Winnipeg (9), Southern Health (5), Prairie Mountain (5), Interlake-Eastern (3), and Northern (2).

Sentinels can also opt in to the voluntary swabbing component of the program, which consists of the submission of either two posterior pharyngeal swabs or two nasopharyngeal swabs within 48 hours of symptom onset from patients presenting with ILI. Requisitions, swabs, and antiviral transport media are available from Cadham Provincial Laboratory (CPL).

The E&S unit receives weekly reports from the Public Health Agency of Canada presenting the provincial ILI rate and the specific data for each of the participating sentinel physicians. The provincial epidemiologist then assigns an activity level code to each of Manitoba's five influenza surveillance regions and submits the completed report to *FluWatch* (see Appendix A for definitions and surveillance map).

For the 2012/2013 season, ILI in the general population was defined as:

Acute onset of respiratory illness with fever and cough and with one or more of the following - sore throat, arthralgia, myalgia, or prostration which is likely due to influenza. In children under 5, gastrointestinal symptoms may also be present. In patients under 5 or 65 and older, fever may not be prominent.

For the 2012/2013 season, ILI/influenza outbreaks were defined as:

Schools: Greater than 10% absenteeism (or absenteeism that is higher (e.g. >5-10%) than expected level as determined by school or public health authority) which is likely due to ILI. Note: it is recommended that ILI school outbreaks be laboratory confirmed at the beginning of the influenza season as it may be the first indication of community transmission in an area.

Hospitals and residential institutions: Two or more cases of ILI within a seven-day period, including at least one laboratory confirmed case. Institutional outbreaks should be reported within 24 hours of identification. Residential institutions include but are not limited to long-term care facilities (LTCF) and prisons.

Workplace: Greater than 10% absenteeism on any day which is most likely due to ILI.

Other settings: Two or more cases of ILI within a seven-day period, including at least one laboratory confirmed case; i.e. closed communities.

b. Health Links – Info Santé

Health Links - Info Santé (HL-IS) is one of 30 inbound and outbound calling programs offered by the Provincial Health Contact Centre (PHCC) operated by Misericordia Health Centre in partnership with Manitoba Health and the Winnipeg Health Region.

Implemented in 1994, the bilingual program was the first telephone, nurse-based triage system in Canada. A staff of 80 full- and part-time registered nurses answer calls 24 hours a day, seven days a week, 365 days a year. Interpreters are available for more than 110 different languages.

Nurses obtain information about symptoms and follow clinical protocols on their computer screens to offer advice on whether to treat the symptoms at home, see a family doctor, or visit an emergency room. Calls range from concerns about abdominal pain to flu virus symptoms.¹

When a caller phones HL-IS and selects the Influenza Service, they are given an option to select information on (1) the groups of individuals who are at an increased risk of serious illness, (2) how to arrange a flu shot, (3) the annual influenza immunization campaign, or (4) the management of flu and its potential complications.

Aggregate data from HL-IS Influenza Service is emailed to the Public Health Division at Manitoba Health on a weekly basis.

B. Laboratory Reporting of Influenza

Reports of culture isolations and enzyme immunoassay (EIA) detections from Cadham Provincial Laboratory (CPL) are forwarded to the E&S unit weekly. While EIA detections and culture isolations comprise the largest number of reports from CPL, seroconversions are similarly forwarded weekly. Information contained within this report is based on positive lab reports received at E&S as of July 2, 2013. This includes specimen dates from July 1, 2012 to June 30, 2013. Out of province reports are excluded.

The specimen date is used to:

- (a) extract cases; and,
- (b) assign cases to the appropriate week/month

One of the general features by which cases are compared is status of federal referral. This indicator does not determine how many cases were First Nations or non-First Nations; however, it provides a proxy measurement of which cases live on and off reserve, based on their current address of residence.

¹ Source: <http://www.misericordia.mb.ca/files/phccfactsheet.pdf>.

C. Hospitalizations, ICU admissions, and deaths

The Public Health Agency of Canada (PHAC) requested weekly collection of aggregate numbers of hospitalized cases (as well as ICU admissions and deaths) to monitor the severity/burden of illness during the influenza season.

The regions were asked to submit an aggregated line list that included the number of hospitalizations, ICU admissions, and deaths to MH. The form also included type/subtype of influenza, age group, reporting week, and aboriginal identity; however, Manitoba did not collect information on Aboriginal identity. Aggregate data were then reported to PHAC on a weekly basis using a reporting form developed by the Public Health Agency of Canada (PHAC).

Hospitalized cases were defined as:

Manitoba residents with laboratory confirmed influenza admitted to a hospital located within the reporting region. The positive specimen must have been obtained between August 26, 2012 and August 24, 2013. Due to very limited influenza activity being reported, aggregate reporting was later suspended the last week of May.

The reason for hospitalization, ICU admission, or cause of death did not have to be attributable to influenza. A positive laboratory test was sufficient for reporting purposes.

Additional Data Sources for Influenza-Related Deaths

Reports of deaths in individuals with influenza can also be based on notification by:

- (a) Chief Medical Examiner;
- (b) Medical Officers of Health in the Regional Health Authorities
- (c) Infection Control Practitioners in long term care facilities

D. Influenza Outbreaks

As outlined in Manitoba's Communicable Disease Management Protocol Manual on Epidemiological Investigation of Outbreaks², the common definition of an outbreak is:

The occurrence in a community or region of cases of an illness with a frequency clearly in excess of normal expectancy. The number of cases indicating presence of an outbreak will vary according to the infectious agent, size and type of population exposed, previous experience or lack of exposure to the disease, and time and place of occurrence. Therefore, the status of an outbreak is relative to the usual frequency of the disease in the same area, among the same population, at the same season of the year.³

Reports of suspected/confirmed influenza outbreaks are directed to the PHS Unit by:

- (a) a phone call/email from public health staff within a RHA; or
- (b) a phone call/email from CPL advising of the assignment of an outbreak code; or
- (c) completion and submission of an outbreak summary report

Only laboratory confirmed reports of influenza outbreaks are included in this report.

² <http://www.gov.mb.ca/health/publichealth/cdc/protocol/investigation.pdf>.

³ Chin, James (Editor). *Control of Communicable Disease Manual*. American Public Health Association, Washington DC, 2000.

E. Vaccination Data

a. Uptake

Influenza vaccination data originates from the Manitoba Immunization Monitoring System (MIMS). Immunization events are captured in MIMS in two ways: publicly-funded immunizations administered by physicians are entered into the system via the physician billing system; all other immunizations, such as those provided by public health nurses, are recorded by data entry staff in the regions. MIMS captures information related to an immunization event, including type of vaccine administered, date of administration and service provider. This influenza season, Manitoba Health again offered a targeted universal program for the influenza vaccine. While all Manitobans were eligible to receive the vaccine, those at increased risk of serious illness or complications from the flu, their caregivers, and close contacts were particularly encouraged to get the flu shot. This included:

- Seniors age 65 or older
- Residents of personal care homes or long-term care facilities
- Children six to 23 months of age
- Those with chronic illness such as:
 - kidney, heart or lung conditions
 - an immune system weakened by disease or medical treatment
 - a condition that makes it difficult to breathe
 - children on long-term aspirin therapy
 - other chronic medical conditions (ex. diabetes, mental disabilities)
- Pregnant women
- Health care workers and first responders
- Individuals of Aboriginal ancestry
- People who are severely overweight or obese
- or as determined by a primary health care provider

In addition, all international students were eligible to receive the publicly-funded influenza vaccine regardless of third party insurance and/or Manitoba Health coverage.

This report uses a snapshot of the MIMS database capturing all influenza immunization events using Tariff code 8791 between September, 2012 and March, 2013 (extracted on April 6, 2013).

b. Adverse Events Following Immunization (AEFI)

Vaccine manufacturers are required by law (Food and Drugs Act and Regulations) to report to PHAC all serious AEFI reports with vaccines (active immunizing agents) for which they are the Market Authorization Holder within 15 days of knowledge of their occurrence. No other legal requirement for reporting AEFI exists nationally. Health care professionals who become aware of reportable adverse events are to report them within 7 days by completing and faxing the AEFI form (http://www.gov.mb.ca/health/publichealth/cdc/docs/aeft_form.pdf) to their regional Medical Officer of Health.

An adverse event following immunization (AEFI) is reportable under the Public Health Act of Manitoba as prescribed in the Immunization Regulation (C.C.S.M. c.P210) if it is temporally associated with an immunizing agent, cannot be attributed to a co-existing condition, and if meets at least one of the following criteria:

- (a) the event is life-threatening, could result in permanent disability, requires hospitalization or urgent medical attention, or for any other reason is considered to be of a serious nature;
- (b) the event is unusual or unexpected, including, without limitation,
 - (i) an event that has not been previously identified, or
 - (ii) an event that has been previously identified but is being reported at an increased frequency;
- (c) at the time of the report there is nothing in the patient's medical history — such as a recent disease or illness, or the taking of medication — that could explain the event.

c. *STRIVE (Surveillance Team Research on Influenza Vaccine Effectiveness)*

Beginning with the 2012/2013 influenza season, Manitoba Health has participated in STRIVE, a national multi-site vaccine effectiveness surveillance network already in operation in Alberta, British Columbia, Ontario, and Quebec. Operated in collaboration with Cadham Provincial Laboratory, STRIVE aims to assess the effectiveness of the 2012-2013 seasonal trivalent influenza vaccine in protecting against influenza and to monitor influenza activity in the region. STRIVE specimens are tested for influenza and other respiratory viruses through PCR and Seeplex RV15 panel. Results of respiratory testing performed by network members were regularly featured throughout the influenza season in the provincial weekly influenza report. For the 2012/2013 season, the Manitoba STRIVE Network included 18 sentinel sites comprising 36 sentinel clinicians (9 sites in Winnipeg RHA, 6 sites in Prairie Mountain RHA, 2 sites in Northern RHA, and 1 site in Southern RHA).

F. Influenza antiviral dispensing and distribution

The number of antiviral drugs (Tamiflu®) dispensed to Manitobans throughout the influenza season was obtained on a weekly basis from the Drug Programs Information Network (DPIN). The numbers in this report include only drugs dispensed from community retail pharmacies. Therefore, these totals do not include any antiviral drugs that were dispensed to in-patients or through nursing stations.

G. Strain Characterization and Antiviral Resistance

The Influenza and Respiratory Viruses section of the National Microbiology Laboratory (NML) undertakes enhanced surveillance, investigations, and research on influenza and other respiratory pathogens, as well as develops, evaluates, and improves new molecular techniques and reagents for early detection and identification of potential epidemic and pandemic influenza strains and other new emerging respiratory viruses.

NML routinely antigenically characterizes influenza viruses received from Canadian laboratories. A random sample of positive influenza specimens isolated by culture was referred from Cadham Provincial Laboratory to the NML for strain characterization. Routine testing for antiviral resistance is also performed. This aggregate level information is shared with provinces and territories on a weekly basis during the influenza season.

RESULTS

A. Syndromic Surveillance

a. Sentinel surveillance of ILI in the community

The peak in ILI rate as reported by sentinel physicians occurred during week 1 (Dec 30, 2012 – Jan 5, 2013), which was two weeks before the peak in reported cases of lab-confirmed influenza (Jan 13-19, 2013) (Figure 1). The mean and the median number of sentinels reporting during the flu season were both 10, with a range of 5 to 17.

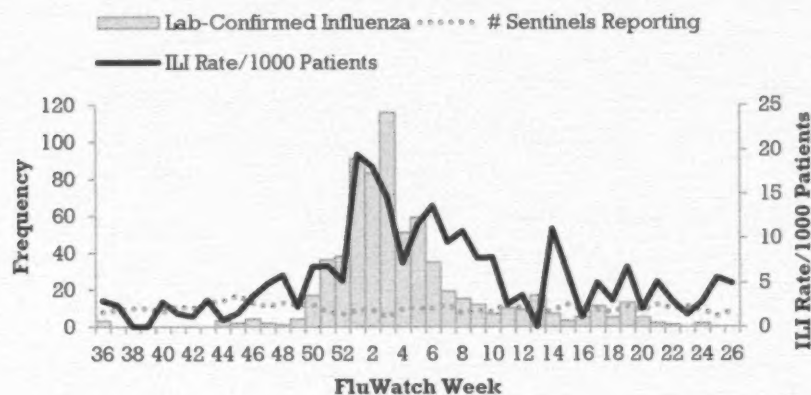


Figure 1. Number of laboratory-confirmed influenza cases, sentinels reporting, and influenza-like illness per 1000 patients by week, Manitoba (2012/2013)

In 2012/2013, the ILI rate per 1000 patients was generally higher than the 5-year provincial average, especially between weeks 52 to 5 (Dec 23, 2012 to Feb 2, 2013) (Figure 2).

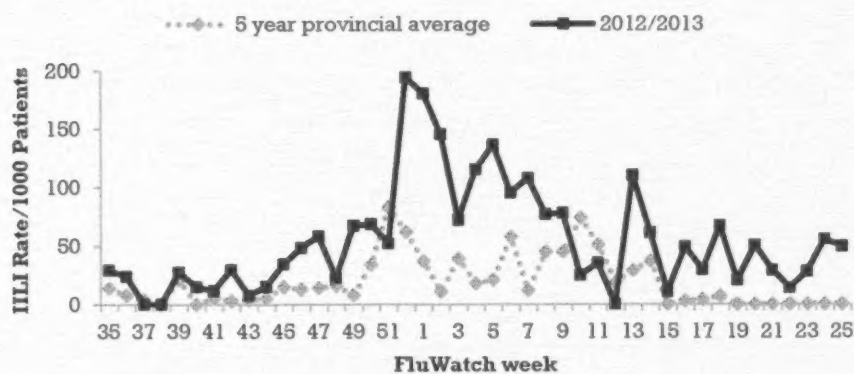


Figure 2. Influenza-like illness rate per 1000 patients by week compared to 5 year provincial average, Manitoba (2012/2013)

b. Health Links - Info Santé

The number of callers peaked during week 42 (n=430 calls, Oct 14-20, 2012), 13 weeks prior to the peak in the number of lab-confirmed cases of influenza reported to Manitoba Health (week 3; Jan 13-19, 2013) (Figure 3). There was a second peak in the number of calls to HL-IS that occurred during week 2 (n=207 calls, Jan 6-12, 2013), which was one week prior to the peak in the number of lab-confirmed cases of influenza.

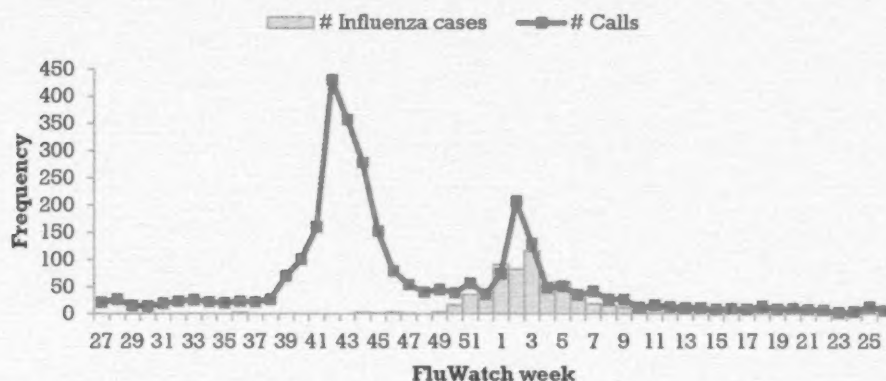


Figure 3. Number of calls received at Health Links - Info Santé Influenza Service and the number of lab-confirmed cases of influenza by week, Manitoba (2012-13)

B. Laboratory Reporting of Influenza

The first lab-confirmed case of influenza A was reported during the week of Sep 2-8, 2012 (FluWatch week 36). The number of reported cases peaked during the week of Jan 13-19, 2013 (n=115 cases) (Figure 4). The last reported lab-confirmed case of influenza A was reported during the week of Jun 9-15, 2013. The first lab-confirmed case of influenza B was reported during the week of Nov 4-10, 2012 (FluWatch week 45) and the last was reported during the week of Jun 9-15, 2013.

There were a total of 578 (84%) cases of influenza A and 110 (16%) cases of influenza B during the 2012/2013 season. Of the influenza A cases, 43 (65.2%) were influenza A/unsubtyped. Of the 184 influenza A cases that were subtyped, there were 166 (90%) cases of influenza A/H3 and 18 (10%) cases of influenza A/H1.

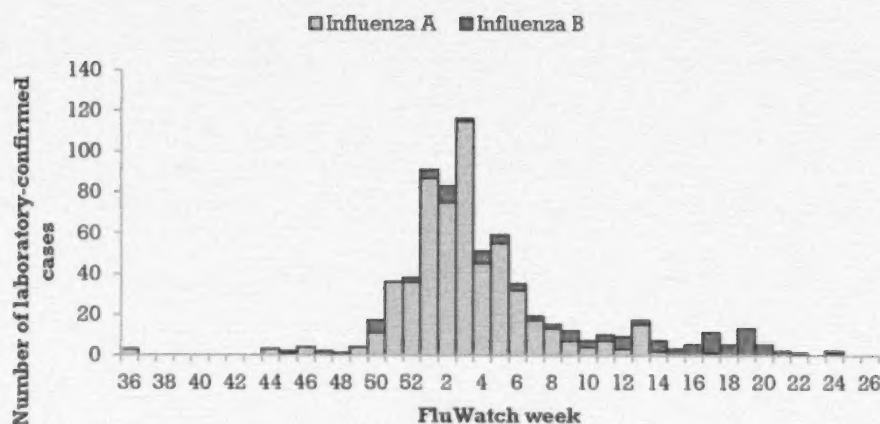


Figure 4. Laboratory-confirmed influenza cases by specimen collection date, Manitoba, 2012/2013 (n=688)

The total number of reported lab-confirmed cases of influenza A (n=578) was higher than in all previous seasons since 2007/2008 excluding the H1N1 pandemic. This season's peak occurred in January (Figure 5) which is more typical of what has been observed in previous seasons since 2007/2008 with the exception of 2011/2012, where the peak occurred in March.

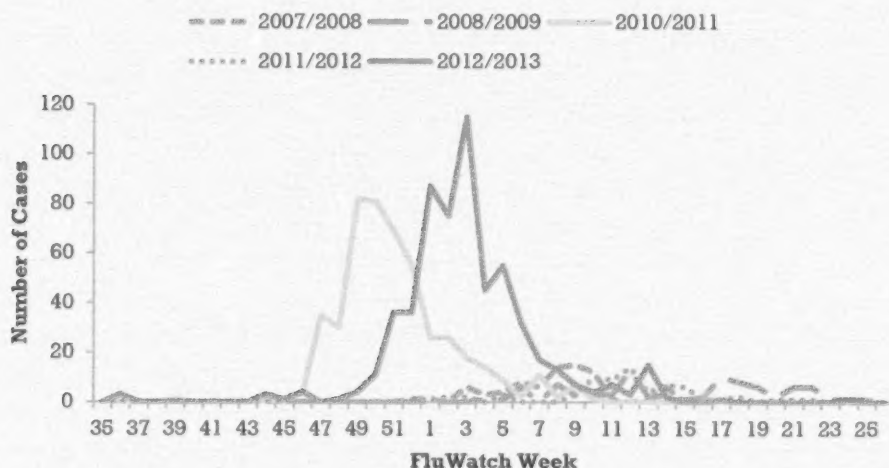


Figure 5. Cases of influenza A in 2012/2013 compared to the last four influenza seasons excluding the 2009/2010 pandemic H1N1 influenza season by week, Manitoba

There were 110 positive lab-confirmed cases of influenza B reported to Manitoba Health this season (Figure 6). While the total number of cases was higher last season, 2012/2013 had the second highest number of reported cases since the 2004/2005 season (data not shown). The season peaked in May this year, which is somewhat later compared to previous seasons.

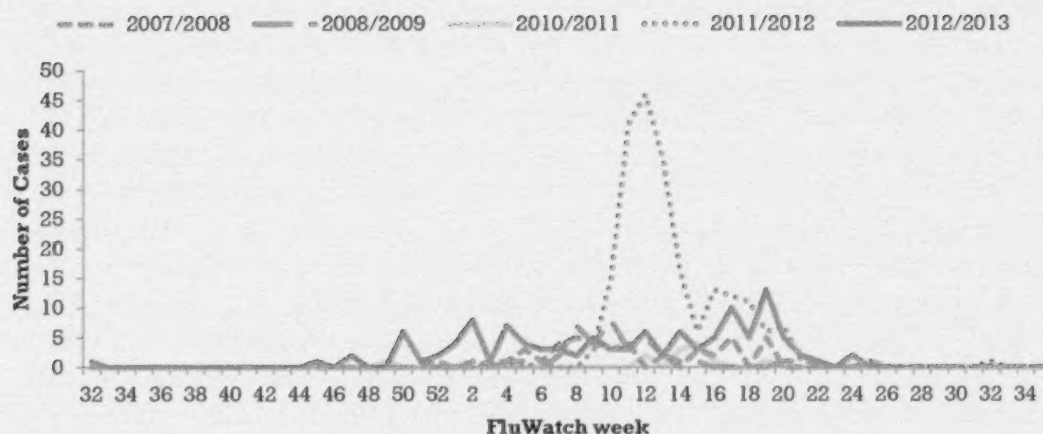


Figure 6. Cases of influenza B in 2012/2013 compared to the last four influenza seasons excluding the 2009/2010 pandemic H1N1 influenza season by week, Manitoba

The incidence rate of influenza A was highest among the very old and the very young (270 cases per 100,000 population among those >79 years and 226 cases per 100,000 population among those <1 year) (Table 1).

The incidence rate of influenza B was highest among those aged over 79 years (34 cases per 100,000 population) followed by those aged <1 year (31 cases per 100,000 population). The remaining age groups varied between 4 cases per 100,000 population among the 20-24 year-olds to 13 cases per 100,000 population among the 5-9 year-olds (Table 1).

Forty seven percent (271/578) of influenza A cases and forty two percent (46/110) of influenza B cases were male.

Table 1. Number of influenza cases and incidence rate^a per 100,000 population by age group and influenza type in Manitoba (2012/2013) (n=688)

Age Group	Influenza A		Influenza B	
	N	Inc. Rate ^b	N	Inc. Rate ^b
<1	36	225.8	5	31.4
1-4	59	89.7	7	10.6
5-9	38	48.5	10	12.8
10-14	23	28.7	9	11.2
15-19	31	35.0	7	7.9
20-24	22	23.8	4	4.3
25-29	19	21.8	6	6.9
30-39	26	15.9	10	6.1
40-49	42	24.2	9	5.2
50-59	50	28.3	13	7.4
60-69	38	30.5	8	6.4
70-79	49	69.2	4	5.6
>79	145	270.3	18	33.6
Total	578	45.5	110	8.7

a. 2012 population file used to calculate incidence rates.

b. per 100,000 population

Regional Health Authority

The highest incidence rate of influenza A was observed in Northern RHA (108 cases per 100,000 population) followed by Prairie Mountain RHA (81 cases per 100,000 population). The remaining RHAs had incidence rates between 25 (Winnipeg RHA) and 48 (Southern RHA) cases per 100,000 population (Table 2). There were no cases reported from the Churchill area.

The highest incidence rate of influenza B was observed in Prairie Mountain RHA (24 cases per 100,000 population). The remaining RHAs had incidence rates between 4 (Northern RHA) and 9 (Southern RHA) cases per 100,000 population. There were no cases reported from the Churchill area.

Table 2. Number of cases and standardized incidence rate^a per 100,000 population of influenza by Regional Health Authority in Manitoba (2012/2013)

RHA	Influenza A		Influenza B		Influenza A+B	
	N	Inc. Rate ^b	N	Inc. Rate ^b	N	Inc. Rate ^b
Northern	82	108.0	4	4.2	86	111.2
Prairie Mountain	149	81.3	40	24.3	189	106.2
Southern	95	47.6	18	9.4	113	56.5
Interlake-Eastern	50	37.7	9	7.6	59	46.2
Winnipeg	200	25.1	39	5.2	239	30.2

a. 2012 population file used to calculate age and sex adjusted incidence rates.

b. per 100,000 population.

As the number of cases was fairly small in some Winnipeg Community Areas, age and sex adjusted incidence rates were calculated only for all influenza cases combined and not separately for influenza A and B. Proportions are presented by Community Area in Table 3 separately for influenza A and B for comparison purposes only.

The incidence rate of influenza was highest Downtown (49 cases per 100,000 population) and lowest in River East (20 cases per 100,000 population) (Table 3). The remaining Community Areas varied between 23 cases per 100,000 population in St. Vital to 44 cases per 100,000 population in Inkster.

Table 3. Number and proportion of cases and standardized incidence rate^a per 100,000 population of influenza by Winnipeg Community Area in Manitoba (2012/2013)

Community Area	Influenza A		Influenza B		Influenza A + B	
	N	%	N	%	N	Inc. Rate ^b
Downtown	36	18.0%	4	10.3%	40	48.5
Inkster	12	6.0%	3	7.7%	15	43.6
St. James - Assiniboia	29	14.5%	5	12.8%	34	39.5
Assiniboine South	10	5.0%	8	20.5%	18	35.4
Transcona	10	5.0%	2	5.1%	12	31.1
Fort Garry	21	10.5%	1	2.6%	22	25.7
River Heights	13	6.5%	4	10.3%	17	24.7
St. Boniface	10	5.0%	3	7.7%	13	23.9
Point Douglas	11	5.5%	0	0.0%	11	23.7
Seven Oaks	16	8.0%	2	5.1%	18	22.8
St. Vital	17	8.5%	1	2.6%	18	22.7
River East	15	7.5%	6	15.4%	21	20.3
Total Winnipeg	200		39		239	30.2

a. 2012 population file used to calculate age and sex adjusted incidence rates.

b. per 100,000 population.

Figure 7 illustrates the standardized incidence rates by RHA and Winnipeg Community Area. Also see Appendix A on page 33 for maps illustrating the standardized incidence rates of influenza by RHA and Winnipeg Community Area.

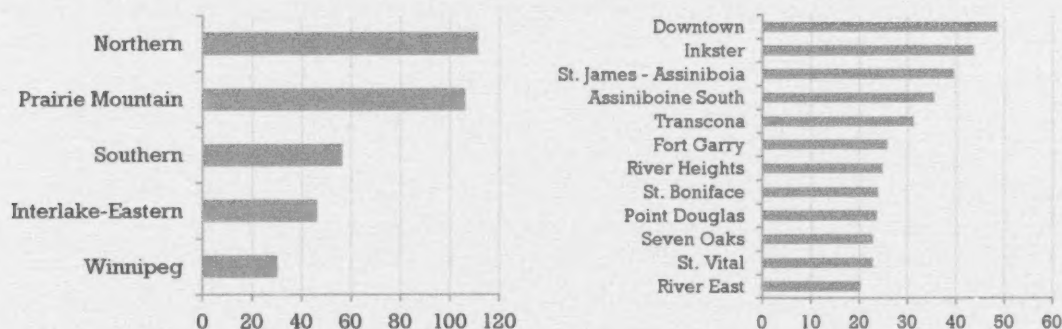


Figure 7. Standardized incidence rates (per 100,000 population) of influenza (A and B) by RHA (left) and Winnipeg Community Area (right) in Manitoba (2012/2013)

Referred Federally

The proportion of influenza A cases referred federally was 16.1% ($n=80/498$). The proportion of influenza B cases referred federally was 2.8% ($n=3/107$).

C. Hospitalizations, ICU Admissions, and Deaths

There were 152 Manitoba residents hospitalized in Manitoba. Twenty five of these individuals were admitted to a Manitoba ICU. There were nine deaths in individuals with a positive lab report of influenza. The severe outcome did not necessarily have to be attributable to influenza but only required temporal association with a positive laboratory report of influenza to be counted.

Figure 8 shows the number of Manitoba residents with laboratory confirmed influenza admitted to a Manitoba hospital (including both ICU and non-ICU admissions). The peak in the number of hospitalizations occurred in weeks 3, where 29 hospitalizations were reported (Jan 13-19, 2013).

The first ICU admission was reported during week 44 (Oct 28 – Nov 3, 2012), and the last ICU admission was reported during week 21 (May 19-25, 2013). The highest number of ICU admissions reported in one week ($n=4$) occurred during week 9 (Feb 23 – Mar 2, 2013).

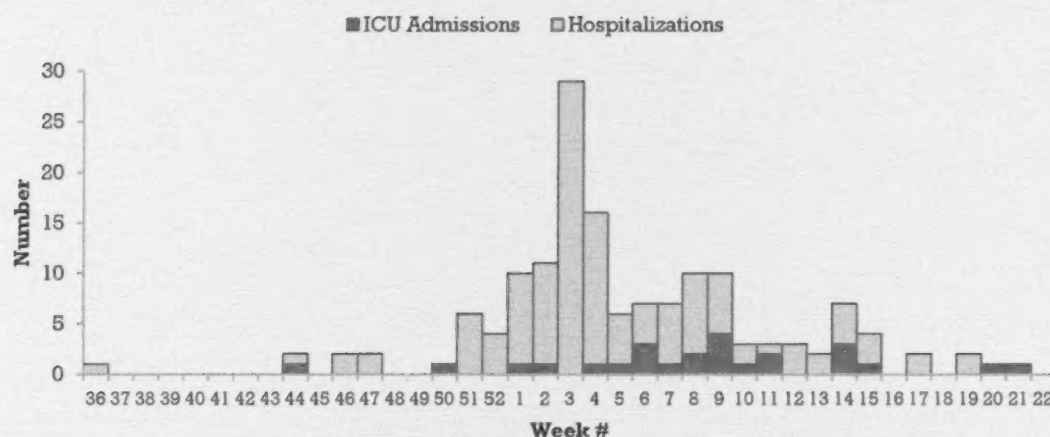


Figure 8. Number of reported hospitalizations (n=152) and ICU admissions (n=25) in patients with laboratory-confirmed influenza by week in Manitoba (2012/2013)

The nine deaths that occurred in Manitoba associated with a positive lab report of influenza were reported between weeks 36 and 20 (Jan. 22-28 and Mar. 18-24, 2012) (Figure 9). The highest number of deaths reported in one week (n=4) occurred during week 5 (Jan 27 – Feb 2, 2013). Just over half of the deaths occurred in hospital (5/9, 56%); the remainder occurred in community (4/9, 44%). Again, the cause of death did not necessarily have to be attributable to influenza to be counted.

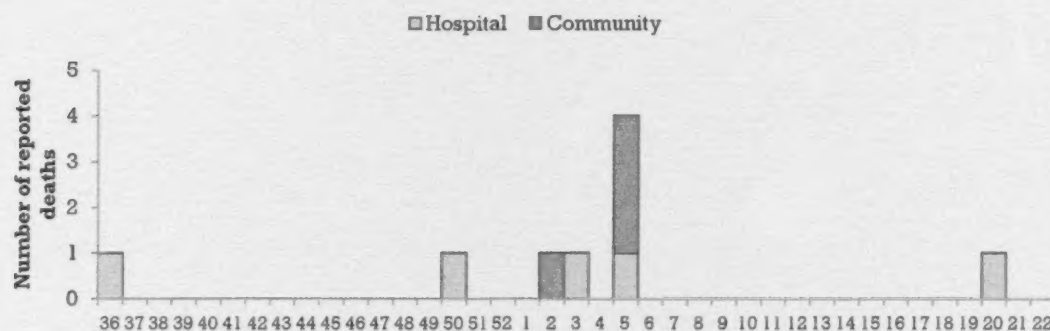


Figure 9. Number of reported deaths in individuals with laboratory-confirmed influenza (n=9), Manitoba (2012/2013)

The greatest number of hospitalizations was reported among those aged 65 years and over (n=57), followed by those aged 20-44 and 45-64 years (n=20, respectively), and those aged <6 months (n=17) (Table 4). The number of ICU admissions was highest among those aged 65 and over (n=8), followed by those aged 45-64 years (n=5). The remaining age groups varied between 0-3 ICU admissions. All but one of the nine deaths occurred among cases aged 65 and over. The other occurred among an individual aged 20-44 years.

Table 4. Age breakdown of hospitalizations and ICU admissions in patients with laboratory-confirmed influenza in Manitoba (2012/2013)

Age Group	Hospitalizations		ICU Admissions	
	N	%	N	%
<6 mos	17	11.2	2	8.0
6-23 mos	13	8.6	2	8.0
2-4 yrs	11	7.2	2	8.0
5-9 yrs	6	3.9	1	4.0
10-16 yrs	6	3.9	2	8.0
17-19 yrs	2	1.3	0	0.0
20-44 yrs	20	13.2	3	12.0
45-64 yrs	20	13.2	5	20.0
65+ yrs	57	37.5	8	32.0
Total	152		25	

Of the 152 individuals with laboratory-confirmed influenza hospitalized in Manitoba, 105 (69%) were residents of the Winnipeg Health Region (Table 5).

Table 5. Location of residence for laboratory confirmed influenza cases admitted to a hospital in Manitoba (2012/2013)

Region of Residence	Hospitalized Cases
Interlake-Eastern	0
Prairie Mountain	22
Northern	3
Southern	22
Winnipeg	105
Total	152

Thirteen percent (n=20) of hospitalized cases were typed as influenza B. Of the 87% (n=132) who were typed as influenza A, 101 were untyped, 8 were subtyped as H1, and 23 as H3. Eight percent of ICU-admitted cases were typed as influenza B (n=2). Of the 92% (n=23) who were typed as influenza A, 16 were untyped, 4 were subtyped as H1, and 3 were subtyped as H3.

Table 6. Typing and subtyping of hospitalized influenza cases in Manitoba (2012/2013)

Type/Subtype	Hospitalizations		ICU Admissions	
	N	%	N	%
A/Untyped	101	66.4	16	64.0
A/H1	8	5.3	4	16.0
A/H3	23	15.1	3	12.0
B	20	13.2	2	8.0
Total	152		25	

D. Influenza Outbreaks

Between September 2012 and May 2013, there were 40 laboratory-confirmed outbreaks of influenza A and 6 of influenza B. The number of reported outbreaks peaked in January ($n=27$) (Table 7). All of the outbreaks occurred in institutional facilities.

Table 7. Number of lab-confirmed influenza outbreaks by month and influenza type in Manitoba (2012/2013)

Month	Influenza A	Influenza B
September	1	0
October	0	0
November	0	0
December	6	2
January	27	0
February	5	1
March	1	0
April	0	1
May	0	2
Total	40	6

Fifty two percent ($n=24/46$) of outbreaks occurred in Winnipeg RHA. Twenty four percent ($n=11/46$) occurred in Prairie Mountain RHA, followed by 11% ($n=5/46$) in Southern RHA, 9% ($n=4/46$) in Interlake-Eastern RHA, and 4% ($n=2/46$) in Northern RHA.

E. Vaccination Data

a. Uptake

The overall provincial influenza vaccine uptake by individuals vaccinated was 20.1% in the 2012/2013 season. By age group, the highest uptake was among Manitobans aged 65 years and over (58.3%), followed by those 19-64 year (15.4%), those 2 years and younger (13.6%), and individuals aged 3-18 years (9.5%) (Figure 10).

By RHA, the highest uptake was observed in Winnipeg RHA (21.9%), followed by Interlake-Eastern RHA (20.6%), Prairie Mountain RHA (20.4%), Northern RHA (17.3%), and Southern RHA (14.7%) (Figure 11).

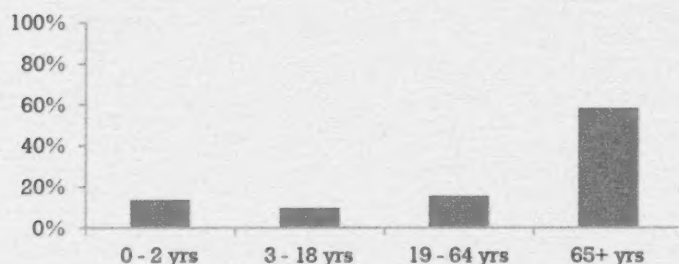


Figure 10. Influenza vaccine uptake by age group in Manitoba (2012/2013)

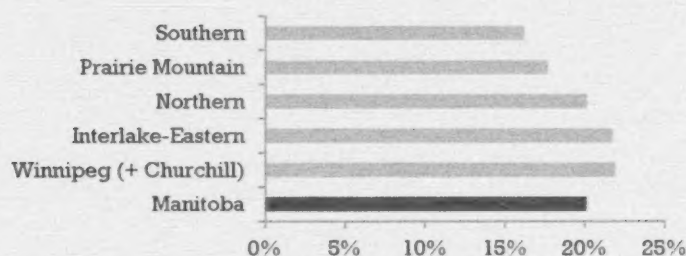


Figure 11. Influenza vaccine uptake by RHA in Manitoba (2012/2013)

b. Adverse Events Following Immunization (AEFI)

A total of 50 AEFI reports were received this season related to the influenza vaccine. Overall, the incidence rate of AEFI was 19.8 per 100,000 individuals vaccinated. By age group, the highest incidence rate was among those aged 3-18 years (59.5 AEFIs per 100,000 individuals vaccinated) and the lowest among those aged 65 years and over (8.2 AEFIs per 100,000 individuals vaccinated) (Table 8).

Table 8. Number and incidence rate (per 100,000 population)* of adverse events following immunization with the influenza vaccine by age group, 2012/2013 season, Manitoba

Age Group	N	Inc. Rate
0-2	2	22.9
3-18	15	59.5
19-64	25	20.8
65+	8	8.2
Total	50	19.8

* Number of individuals vaccinated used as denominator.

The majority of AEFI reports (n=32, 64%) reported an allergic or allergic-like event, followed by local reaction (n=28, 56%), and other defined event of interest (n=13, 26%) (Table 9). There were four reports of a neurologic event, four reports of anaphylaxis, and no reports of oculo-respiratory syndrome. Some people experienced more than one reaction in a single episode, which means there was a greater number of reactions reported (n=81) than reports submitted (n=50).

Table 9. Type of adverse event following immunization with the influenza vaccine, 2012/2013 season, Manitoba

Type of adverse event:	N	%*
Local reaction	28	56%
Allergic or allergic-like event	32	64%
Anaphylaxis	4	8%
Oculo-respiratory syndrome	0	0%
Neurologic events	4	8%
Other defined event of interest	13	26%
Total number of reports**	50	

* Percentage based on total number of reports received.

** Total number of types of reactions is greater than total number of reports received as some people experienced more than one reaction in a single episode.

In terms of level of care obtained, the majority (34%) reported that no care was obtained by the person experiencing the adverse event (Table 10). The next most frequent level of care obtained was non-urgent visit to a health care professional and telephone advice from a health professional (both 22%). Fourteen percent reported an ER visit, and 4% reported hospitalization.

Table 10. Level of care obtained reported in an adverse event following immunization with the influenza vaccine, 2012/2013 season, Manitoba

Level of Care:	N	%
None	17	34%
Telephone advice from health professional	11	22%
Non-urgent visit	11	22%
Emergency visit	7	14%
Hospitalization	2	4%
Prolongation of existing hospitalization	0	0%
Unknown	1	2%
Missing	1	2%
Total	50	100%

The most frequently reported outcome following the AEFI was “fully recovered” at time of form completion (44%) followed by “not yet recovered” (40%) (Table 11). There was one death reported.

Table 11. Outcome of adverse event following immunization with the influenza vaccine, 2012/2013 season, Manitoba

Outcome:	N	%
Fully recovered	22	44%
Not yet recovered	20	40%
Permanent disability	0	0%
Death	1	2%
Unknown	6	12%
Missing	1	2%
Total	50	

The most frequently reported recommendation following review of the adverse event by the regional Medical Officer of Health (MOH) was no change to the immunization schedule (62%) followed by expert referral (22%; e.g. to an allergist), controlled setting for next immunization (14%), and active follow-up for AEFI recurrence (12%) (Table 12). There were two reports received with no recommendation by an MOH.

Table 12. MOH recommendation of adverse event following immunization with the influenza vaccine, 2012/2013 season, Manitoba

Recommendation:	N	%*
No change to immunization schedule	31	62%
Expert referral	11	22%
Determine protective antibody level	0	0%
Controlled setting for next immunization	7	14%
No further immunization with flu vaccine	0	0%
Active follow-up for AEFI recurrence	6	12%
Other	1	2%
Missing	2	4%
Total**	50	

* Percentage based on total number of reports received.

** Total number of recommendations (n=56) is greater than the number of reports received (n=50) as more than one recommendation was made for some single episodes of an adverse event.

c. STRIVE (Surveillance Team Research on Influenza Vaccine Effectiveness)

Throughout the influenza season, there were 46 STRIVE specimens that tested positive for influenza A and 13 that tested positive for influenza B. These cases are included in the total number of provincial influenza cases. Of the 46 cases of influenza A, 65% (30/46) were subtyped as H3, 4% (2/46) as H1, and the remaining 30% were untyped (14/46).

Roughly half of the cases reside in Prairie Mountain RHA (53%, 31/59), followed by 22% from Winnipeg RHA (13/59), 20% from Southern RHA (12/59), 3% from Northern RHA (2/59), and 2% from Interlake-Eastern RHA (1/59).

Half of the cases were aged 19-64 years at the time the specimen was taken (30/59). Just under one third of cases were aged 3-18 years (17/59), followed by 12% of cases aged 0-2 years (7/59), and 9% of cases aged 65 and over (5/59).

F. Influenza antiviral dispensing and distribution

The daily number of units of antivirals dispensed was provided to Manitoba Public Health on a weekly basis since January 1, 2013. Prior to this, an aggregate total since September 1, 2012 was provided. Between Sep 1, 2012 and June 2, 2013, 1581 units of oseltamivir were dispensed from community retail pharmacies.

The grey bars in Figure 12 illustrate the number of units of antivirals dispensed by date since January 1, 2013. The black line represents the number of lab-confirmed cases of influenza by date. In general, as the number of cases increased, the number of units of antivirals dispensed also increased.

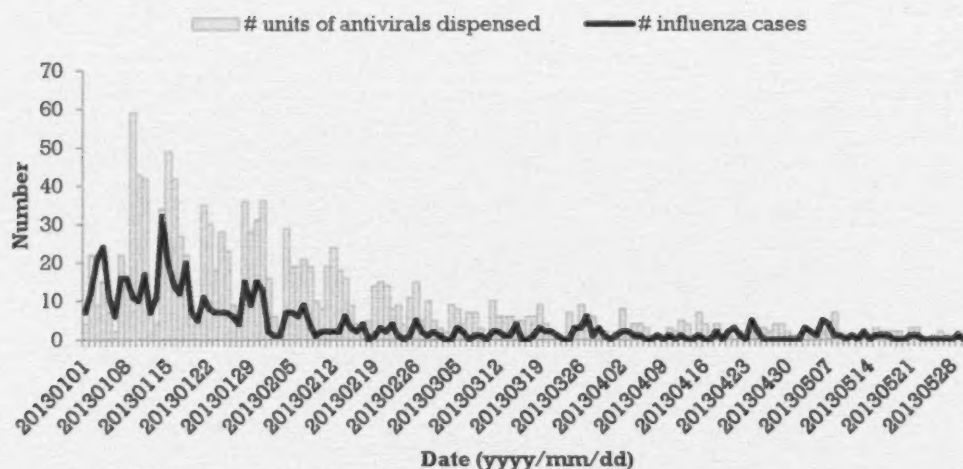


Figure 12. Number of units of antivirals dispensed and number of lab-confirmed influenza cases by week, Manitoba

G. Strain Characterization and Antiviral Resistance

Strain Characterization

From September 1, 2012 to July 4, 2013, National Microbiology Laboratory (NML) reported that it had antigenically characterized 21 influenza viruses received from CPL. Seven influenza A/H3N2 viruses characterized were antigenically related to A/Victoria/361/2011, five influenza A/H1N1 viruses were antigenically related to A/California/07/2009, three influenza B viruses were antigenically related to B/Brisbane/60/2008, and six influenza B viruses were antigenically related to B/Wisconsin/01/2010.

Nationally, NML antigenically characterized 1453 influenza viruses (644 H3N2, 243 H1N1, and 566 B viruses) that were received from Canadian laboratories. All influenza A/H3N2 viruses were antigenically similar to A/Victoria/361/2011, which is the influenza A/H3N2 component recommended for the 2012/2013 influenza vaccine. All influenza A/H1N1 viruses were antigenically similar to A/California/7/2009, which is the influenza A/H1N1 component recommended for the 2012/2013 influenza vaccine. 439 influenza B viruses characterized were antigenically similar to the vaccine strain B/Wisconsin/01/2010. 127 influenza B viruses were characterized as B/Brisbane/60/2008-like, which belongs to the Victoria lineage.

Antiviral Resistance

From September 1, 2012 to July 4, 2013, NML has tested for antiviral resistance on Manitoba isolates with the following results:

Table 13. Antiviral resistance summary of Manitoba influenza isolates, 2012/2012

Antiviral:	Influenza A(H3N2)		Influenza A(H1N1)pdm09		Influenza B	
	Resistant	Sensitive	Resistant	Sensitive	Resistant	Sensitive
Amantadine	9	0	7	0	N/A	N/A
Oseltamivir	0	6	0	5	0	9
Zanamivir	0	6	0	5	0	9

Nationally, from September 1, 2012 to July 4, 2013, NML has tested for antiviral resistance on Canadian isolates with the following results:

Table 14. Antiviral resistance summary of Canadian influenza isolates, 2012/2013

Antiviral:	Influenza A(H3N2)		Influenza A(H1N1)pdm09		Influenza B	
	Resistant	Sensitive	Resistant	Sensitive	Resistant	Sensitive
Amantadine	1030	1	281	0	N/A	N/A
Oseltamivir	1	638	1	241	1	540
Zanamivir	1	638	0	239	1	540

DISCUSSION AND RECOMMENDATIONS

General Limitations

Influenza surveillance is inherently biased towards more severe outcomes as not all individuals experiencing symptoms will seek medical attention, and not all clinicians will routinely test cases of influenza-like illness for influenza. The true burden of influenza in Manitoba is likely under-estimated as there is no true denominator for all individuals infected. The information available will serve to characterize severe cases and to monitor trends; however, since we cannot compare characteristics of severe to mild cases, we will not be able to identify true risk factors for severe clinical outcome for this influenza season. Comparison of severe clinical cases from the 2009 pandemic to the severe cases seen this season will be limited by the fact that different data collection forms were used and not all of the same information was collected during each season.

A. Syndromic Surveillance

a. FluWatch

Surveillance of influenza-like illness (ILI) approximates the true burden of influenza in the population. While it may also capture the burden of other circulating respiratory viruses, it can provide a good estimate of disease when combined with other reliable data sources such as laboratory testing.

The *FluWatch* ILI data would suggest that routine monitoring of the weekly ILI rate does not provide a reliable early indication of the peak in the flu season. Compared to last season where the peak in ILI occurred several weeks prior to the peak in lab-confirmed cases, this season the peak in ILI occurred one week before the peak in lab-confirmed cases. After review, there was also an association found between the peak in ILI and another monitored respiratory virus, respiratory syncytial virus; however, this was not the case last season where no association was found (data not shown).

In order to enhance the capacity to monitor ILI trends in Manitoba, a model similar to that currently used by the *FluWatch* program has been considered. This model compares the current ILI rate to a calculated five year provincial average. These data are available from a secure web-based application within PHAC's Canadian Network for Public Health Intelligence (CNPHI), which houses

current and historical FluWatch ILI activity and outbreak data. The five year historical comparison provides a more statistically reliable indicator against which to compare weekly ILI data versus what was observed at the same time last season. In this way, one can quickly assess in real-time whether what is being observed is above or below what is expected on average.

It is difficult to determine if Manitoba's sentinels provide adequate provincial representation, as on average, less than 50% of sentinels are reporting each week. Moving forward into subsequent flu seasons, it will be important to consider innovative methods of sentinel retention and recruitment in order to maximize the effectiveness of this ILI surveillance program.

One way Manitoba Health has addressed this issue is by partnering with the Winnipeg Regional Health Authority and the University of Manitoba to support a national multi-site vaccine effectiveness surveillance network, which is already operational in four other Canadian provinces. While the primary function of this network is to assess the effectiveness of the seasonal influenza vaccine, a secondary function is to monitor influenza activity through sentinel sites across the province. During the 2011/2012 season, sites were restricted to the Winnipeg area; however, the partnership has also expanded the network of sites throughout Manitoba for this and subsequent influenza seasons.

b. Health Links – Info Santé

The peak in the number of calls to Health Links – Info Santé (HL-IS) occurred prior to the beginning of the influenza season, which is a feature observed last flu season as well. This is encouraging, as this would suggest that Manitoba Health's influenza immunization campaign is positively creating awareness about the importance of getting the vaccine. A second, smaller peak in the number of calls was observed one week prior to the peak in the number of lab-confirmed cases.

Over half of all callers during the entire influenza season (53%) selected to hear information about influenza clinics. About one third of all callers selected to hear information about managing influenza symptoms.

Due to the limitations of these data, their interpretation is difficult. Demographic and other information is not collected from the callers; therefore, it is not known if the people at greatest risk of severe outcomes are receiving the information about the flu vaccine. The geographic distribution of callers is also unknown; it is unknown if all Manitobans are utilizing this service or if utilization is concentrated within a specific geographic area.

B. Laboratory-Confirmed Influenza

The number of reported cases of influenza A in 2012/2013 (n=578) was higher than any previous season since 2007/2008 with the exception of the H1N1 pandemic. Further investigation is required to understand the potential reasons for this.

The number of reported lab-confirmed cases of influenza B this season (n=110) was lower than last season (n=214); however, it is the second highest number of cases reported since 2004/2005 (data not shown). The number of cases also peaked somewhat later (in May) than in previous seasons. The reasons for this are unclear; however, this could be a function of increased healthcare seeking behaviour and testing as a result of heightened concern over the newly discovered avian influenza A H7N9 virus reported by China to the World Health Organization on March 31, 2013.

Testing of isolates may decrease once influenza has been circulating in the community, leading to a decrease in positive lab results. In addition, testing during an outbreak often stops once an etiologic agent has been identified. As such, this will bias case counts towards under-reporting.

In general, the ages of cases most affected were those typically seen in past non-pandemic flu seasons (the very young and very old age groups). Excluding the influenza A pandemic H1N1 season, this age trend has been observed repeatedly in previous flu seasons (Table 15). The highest incidence rates have consistently been observed among these two age groups (see Appendix B on page 36 for extended table):

Table 15. Incidence rate (per 100,000 population) of influenza A by youngest and oldest age group in Manitoba

Season:	Age Group	
	<1 year	>79 years
2003/2004	135.6	100.1
2004/2005	57.3	155.7
2005/2006	34.9	58.2
2006/2007	67.0	33.7
2007/2008	90.3	21.5
2008/2009	44.2	51.9
2010/2011	194.7	189.9
2011/2012	44.4	18.8

The standardized incidence rate of influenza (A and B combined) was highest in Northern RHA (111.2 cases per 100,000 population), followed closely by Prairie Mountain RHA (106.2 cases per 100,000 population). This trend in the north was also observed in 2011/2012 where the crude incidence rate of influenza was 260.6 cases per 100,000 population in Burntwood and 24 cases per 100,000 population in Nor-Man, the next highest incidence rate. Twenty four percent of outbreaks occurred in Prairie Mountain, so this may account for the higher incidence rates observed in this RHA.

Age and sex adjusted rates calculated for the 2012/2013 season were very similar to the crude incidence rates (data not shown). Therefore, this suggests that other risk factors may be driving the higher rates in the north. A more comprehensive exploration of risk factors may be warranted to better understand these RHA disparities.

Age and sex adjusted incidence rates calculated for Winnipeg Community Areas reveal somewhat similar trends as were observed in 2011/2012 with some differences. This season, the highest incidence rate was observed Downtown (48.5 cases per 100,000 population), followed by Inkster (43.6 cases per 100,000 population), St. James Assiniboine (39.5 cases per 100,000 population), and Assiniboine South (35.4 cases per 100,000 population). In 2011/2012, the highest burden of illness was reported in Point Douglas (24.5 cases per 100,000 population) and Downtown (22.5 cases per 100,000 population). The high incidence rates reported in St. James Assiniboia and Assiniboine South could be due to the high number of influenza outbreaks reported in these neighbourhoods compared to other Winnipeg Community Areas.

It is difficult to draw any conclusions from cases that were referred federally, as this is not a reliable indicator for First Nations status. It can be stated that a greater proportion of influenza A cases were referred federally (16%) than influenza B cases (3%).

C. Hospitalizations, ICU admissions, and deaths

Data on clinical severity have only been collected since 2009 in response to the Influenza A H1N1 pandemic. Historically, there is no record of these data being collected in previous seasons prior to the pandemic; therefore, limited comparisons can be made.

During the pandemic season, there were 383 hospitalized cases, of which 71 (19%) were admitted to an ICU. In 2010/2011, there were 98 hospitalized cases, of which 15 (15%) were admitted to an ICU. In 2011/2012, there were 68 hospitalized cases, of which 10 (15%) were admitted to an ICU. The proportion of cases admitted to ICU this season (16%) is consistent with what has been observed in previous seasons. The peak in the number of hospitalizations occurred in May and November during the pandemic, in December during the 2010/2011 season, and in late March – early April during the 2011/2012 season. This season, the peak in the number of hospitalizations occurred in January.

There were 11 reported deaths during the H1N1 pandemic, 7 reported in 2010/2011, 4 reported in 2011/2012, and 9 reported in 2012/2013. Five of the seven deaths reported in 2010/2011 occurred among cases aged over 75 years. Three of the four deaths reported in 2011/2012 occurred among cases aged 65 and over. Similarly, 8 of the 9 deaths reported in 2012/2013 occurred among cases aged 65 and over. In contrast, the majority of deaths (73%) reported during the pandemic occurred among cases aged between 20-59 years.

The greatest proportion of hospitalizations this past season was among cases aged 65 years and over (37.5%), followed by cases aged 45-64 years and 20-44 years (13.2%, respectively). This is in contrast to the 2011/2012 season, where the greatest proportion of hospitalizations occurred among cases aged 5-19 years (25%) closely followed by cases aged 1-4 years (24%). This is possibly due to the fact that influenza B was the dominant circulating type, which is more common among younger age groups⁴.

This season, the greatest proportion of ICU admissions was observed among cases aged 65 and over (32%). This is the same trend that was observed last season (30%). In contrast, during the pandemic, 4% of ICU admissions occurred among cases aged over 65 years with the majority occurring among cases aged 46-65 years (28%), followed by 20% among 26-35 year-olds and 20% among 36-45 year-olds.

This season, additional surveillance data were not collected from ICU-admitted cases; therefore, no comparisons can be made to these enhanced data that were collected during the 2010/2011 season.

It is not known if aggregate reporting of severe outcomes related to lab-confirmed influenza will continue in Manitoba for the 2013/2014 season. Surveillance recommendations made by the Public Health Agency of Canada have not yet been communicated to provinces and territories.

D. Influenza Outbreaks

Outbreaks of respiratory illnesses are reported to Manitoba Health by regional stakeholders on a voluntary level, and the actual number of outbreaks may be greater due to under-reporting.

⁴ Belshe, R.B. (2010). The need for quadrivalent vaccine against seasonal influenza. *Vaccine*, 28 Suppl 4, D45-53. doi:10.1016/j.vaccine.2010.08.028

This season, the number of laboratory confirmed outbreaks (n=46, 40 influenza A and 6 influenza B) was higher than what was reported in the 2011/2012 season (n=9 outbreaks). Typically, between 9 and 20 outbreaks have been reported seasonally since 2005/2006 (Table 16); however, there were 38 outbreaks in 2010/2011. It is possible that the number of outbreaks in 2010/2011 was higher because it was the first post-pandemic season, and there may have been residual increased vigilance as a result of effects of the pandemic.

This past season, all outbreaks were reported by long-term care facilities (LTCF), which is the same trend as last season. The majority of outbreaks have been reported by LTCF in all previous non-pandemic seasons since 2005/2006 (85% of outbreaks reported by LTCF in 2005/2006, 56% in 2006/2007, 83% in 2007/2008, 55% in 2008/2009, and 90% in 2010/2011).

The reasons for this increase in the number of reported outbreaks are not known due to the limited amount of summary level data collected on outbreaks; however, potential contributing factors to explore might include increased reporting and testing by LTCF as compared to other types of facilities or unvaccinated populations visiting high risk residents within LTCF. A comprehensive investigation of contributing factors of this trend may be warranted to determine strategies to reduce its occurrence in future seasons.

Table 16. Number of reported lab-confirmed influenza outbreaks by season (excluding pandemic H1N1 season), Manitoba

Season:	Influenza A	Influenza B	Total
2005/2006	12	1	13
2006/2007	9	0	9
2007/2008	6	6	12
2008/2009	19	1	20
2010/2011	38	0	38
2011/2012	3	6	9
2012/2013	40	6	46

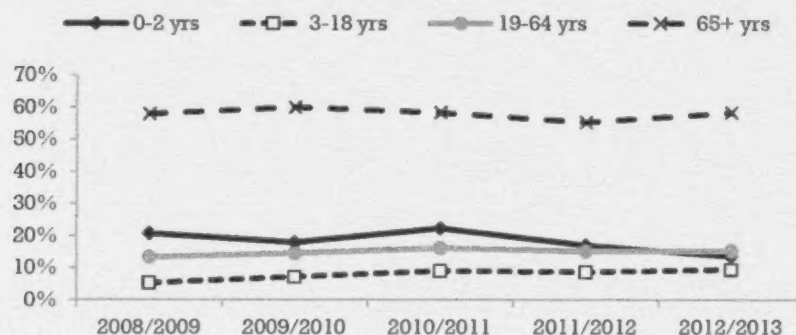
E. Vaccination Data

a. Uptake

The overall provincial influenza vaccine uptake for the 2011/2012 season was 20%, which is comparable to the uptake reported for the 2011/2012 season (20%) and the 2010/2011 season (21%). Currently, Manitoba does not have provincial uptake targets; however, a provincial immunization strategy is under development, which will address this topic.

Similar age group trends were observed for all seasons since 2008/2009, with the lowest uptake observed among 3-18 year-olds and the highest among those aged 65 years and over (Figure 13). However, this season, contrary to all previous seasons since 2008/2009, the uptake among those aged 19-64 years (15.4%) was higher than that among 0-2 year-olds (13.6%). Between 2008/2009 and this season, the uptake has increased in all age categories (between 0.4% to 4.2% increased uptake) except among those aged 0-2 years, where it decreased by 7.1%.

Figure 13. Influenza vaccine uptake by age group and season, Manitoba



The highest uptake was observed in Winnipeg (+ Churchill) this season (21.9%) and the lowest in Southern (16.2%). If the former 11 RHAs are considered rather than the 5 new amalgamated RHAs, the uptake patterns are similar to last season: South Eastman had the lowest uptake (same as last season), and Assiniboine had the highest uptake (second highest last season) (data not shown). Again, if the former RHAs are considered individually, uptake remained fairly stable in most former RHAs except for Churchill, where it decreased by 9% (data not shown).

Information on uptake among priority groups was not obtained apart from during the H1N1 pandemic and therefore cannot be commented on in this report.

b. Adverse Events Following Immunization (AEFI)

The incidence rate of AEFI reports related to the seasonal influenza vaccine is slightly higher (19.8 per 100,000 individuals vaccinated) than the incidence rate last season (17.1 per 100,000 individuals vaccinated).

Contrary to last season where the highest incidence rate was observed among the youngest age group (6 months to 2 years, 38.1 per 100,000 individuals vaccinated), this season the highest incidence rate was observed among those aged 3-18 years (59.5 per 100,000 individuals vaccinated). However, the age group with the lowest incidence rate was the same this season as last (65 and over, 11.2 per 100,000 individuals vaccinated last season and 8.2 per 100,000 individuals vaccinated this season).

This season, the highest proportion of adverse events was reported as allergic or allergic-like event (64.0%) followed by local reaction (56.0%), whereas last season the highest was local reaction (52.4%) followed by allergic or allergic-like event (52.4%). There were more episodes of anaphylaxis reported this season (n=4) compared to last season (n=1). This season there were no reported episodes of oculo-respiratory syndrome; there was one last season. Finally, there was roughly the same proportion of reports categorized as "other defined event of interest" last season (28.6%) and this season (26.0%).

In terms of level of care obtained following the adverse event, the proportion of people who sought no care this season (34.0%) was slightly higher than last season (26.2%). "No care obtained" was the category with the highest proportion this season, which is in contrast to last season where the level of care sought most often was "emergency visit" (33.3%). This season there were two hospitalizations reported associated with an adverse event; last season there were none. The proportion of reports submitted with this information missing was lower this season (2.0%) than the 2011/2012 season

(7.1%), which was lower than the 2010/2011 season (16.1%). This could be a reflection of the users becoming more familiar with the new reporting form, which was introduced in 2009.

The outcome of the adverse event was most commonly reported as fully recovered (44.0%), which is much higher than last season (26.2%). The proportion indicating that the client had not yet recovered from the episode at the time of form completion was lower this season (40.0%) compared to last season (57.1%). This season, there was one reported death following immunization with the influenza vaccine. None were reported last season or the season prior.

The proportion of reports with a Medical Officer of Health recommending no change to the immunization schedule was highest both this season and last season; however, it was 62.0% this season and 78.6% last season. The remaining categories were fairly similar in terms of rank order. The proportion of reports with this information missing continues to be low (<5%). This is an encouraging trend indicating that form completeness has improved since the introduction of this new AEFI form.

Limitations with AEFI data include the inability to determine a direct cause and effect relationship between the immunizing agent and the adverse event due to a multitude of other competing factors. For example, in this summary, people may have received other vaccines at the same time as receiving the seasonal influenza vaccine. Further, frequently missing information impedes the ability to identify patterns or issues with a specific lot number, for example. However, this issue appears to be improving. Finally, the reporting system is paper-based in Manitoba, which decreases efficiency and reliability of the data, as it is being filled out and then submitted to Manitoba Health where it is later entered into an electronic database. A web-based paperless system would simplify the review process, increase data reliability, and facilitate data submissions to PHAC. This option is currently being explored by Manitoba Health. Since last season, this form has been made into a fillable PDF version; however, it must still be faxed or mailed to Manitoba Health (no ability to submit electronically yet).

c. STRIVE (Surveillance Team Research on Influenza Vaccine Effectiveness)

The laboratory results of specimens submitted through STRIVE provide valuable information about how influenza is affecting the average, otherwise healthy Manitoban, which may differ from the more severe cases who present to a hospital for treatment. As the program grows, STRIVE data will help illustrate a more complete picture of the distribution of influenza in Manitoba. This is substantiated by the fact that the half of STRIVE cases were aged 19-64 years, an age group that typically experiences milder symptoms of influenza.

In addition, STRIVE data provide more timely information about the subtypes and strains of influenza viruses circulating, which can better inform public health stakeholders about how effective the vaccine is at preventing influenza. This season, the dominant circulating influenza A virus was H3N2, which was also reflected in the high proportion of STRIVE cases reported as this type (65%). Information on the strains of influenza associated with STRIVE specimens was not available at the time of this report.

Vaccine effectiveness estimates derived from the national surveillance program were not available at the time of this report.

Work is underway to continue to recruit sentinel sites in order to expand the STRIVE network geographically and to different types of facilities (e.g. nursing stations).

F. Influenza antiviral dispensing and distribution

While the number of units of antivirals dispensed provides some information about the spread of influenza in the community, the value is limited in scope without further details about the people receiving the antivirals. Information about the age, sex, location, diagnosis and outcome would be useful to better monitor the pattern of influenza infection occurring within the general population. This level of detail was not requested this past season; however, it could be obtained and used to enhance surveillance for future influenza seasons.

G. Strain Characterization and Antiviral Resistance

Strain Characterization

The World Health Organization (WHO) recommended that the trivalent influenza vaccine contain A/California/7/2009(H1N1)pdm09-like, A/Victoria/361/2011(H3N2)-like, and B/Wisconsin/1/2010-like (B Yamagata lineage) antigens for the 2012/2013 season in the Northern Hemisphere.⁵ These changes, based on serological studies⁶, differ from last season, where the A/Perth/16/2009(H3N2)-like and B/Brisbane/60/2008-like antigens were recommended.

The WHO recommendations correspond to Manitoba's and Canada's characterized influenza viruses submitted by our Provincial Public Health Laboratory. This provides evidence that the seasonal trivalent influenza vaccine provided protection against the circulating strains of the influenza A and B viruses. In contrast to last season, there appears to have been a better lineage level vaccine match to the dominant circulating strain of influenza B, as over three quarters of the influenza B viruses characterized nationally were antigenically related to B/Wisconsin/1/2010-like.

Antiviral Resistance

Oseltamivir and Zanamivir are the recommended antiviral treatments in Canada. Antiviral susceptibility testing by NML on Manitoba isolates indicated that Oseltamivir-resistance and Zanamivir-resistance was not observed for any of the isolates tested. This was not the case for all isolates tested in Canada. One influenza A(H3N2) isolate was resistant to both Oseltamivir and Zanamivir, one influenza A(H1N1)pdm09 isolate was resistant to Oseltamivir, and 1 influenza B isolate was resistant to both Oseltamivir and Zanamivir. Influenza A viruses showed ongoing resistance to Amantadine, further supporting the recommendation that Amantadine should not be considered as an antiviral option in Canada.

⁵ <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/12vol38/acs-dcc-2/assets/pdf/acs-dcc-2-eng.pdf>.

⁶ http://www.who.int/influenza/vaccines/virus/recommendations/201202_qanda_recommendation.pdf.

APPENDIX A : FluWatch activity level definitions and provincial RHA map

- 1 = No activity: No laboratory-confirmed influenza detections in the reporting week; however, sporadically occurring ILI may be reported.
- 2 = Sporadic: Sporadically occurring ILI and lab confirmed influenza detection(s) with NO outbreaks detected within the influenza surveillance region.
- 3 = Localized: (1) Evidence of increased ILI* and
(2) Lab confirmed influenza detection(s) together with
(3) Outbreaks in schools, hospitals, residential institutions and/or other types of facilities occurring in less than 50% of the influenza surveillance region†.
- 4 = Widespread: (1) Evidence of increased ILI* and
(2) Lab confirmed influenza detection(s) together with
(3) Outbreaks in schools, hospitals, residential institutions and/or other types of facilities occurring in greater than or equal to 50% of the influenza surveillance region†.

Note: ILI data may be reported through sentinel physicians, emergency room visits or health line telephone calls.

* More than just sporadic as determined by the provincial/territorial epidemiologist.

† Influenza surveillance regions within the province or territory as defined by the provincial/territorial epidemiologist.

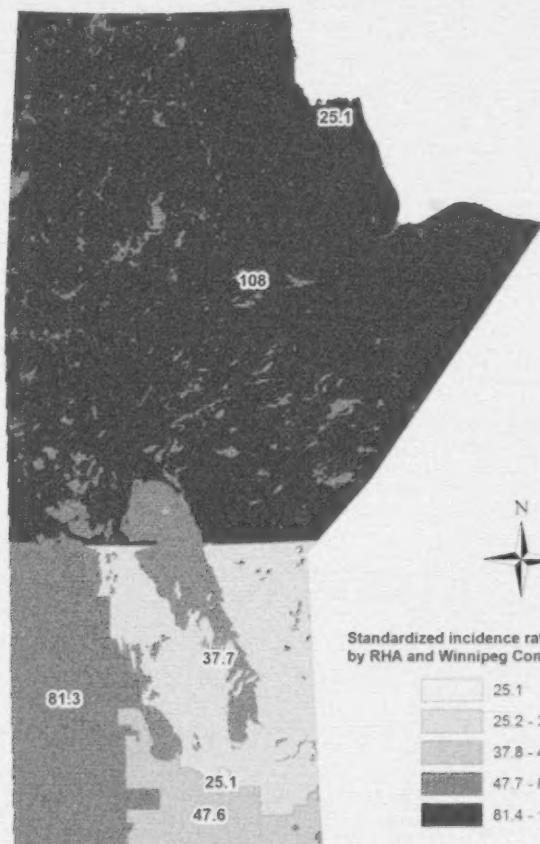
- 1) Northern RHA
- 2) Prairie Mountain RHA
- 3) Interlake-Eastern RHA
- 4) Winnipeg and Churchill RHA
- 5) Southern Health RHA



APPENDIX B: Maps of standardized incidence rates of influenza by RHA and Winnipeg community area

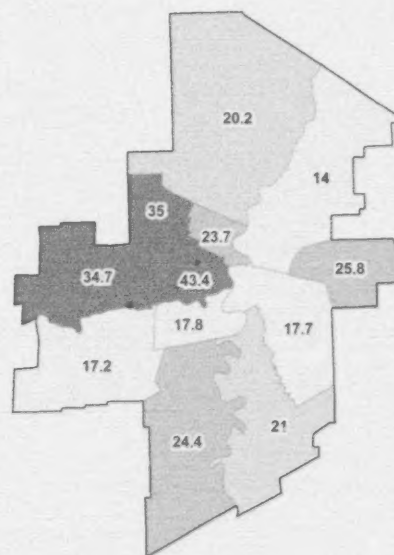
Standardized incidence rates of influenza A by RHA and Winnipeg community area, 2012/2013

Manitoba



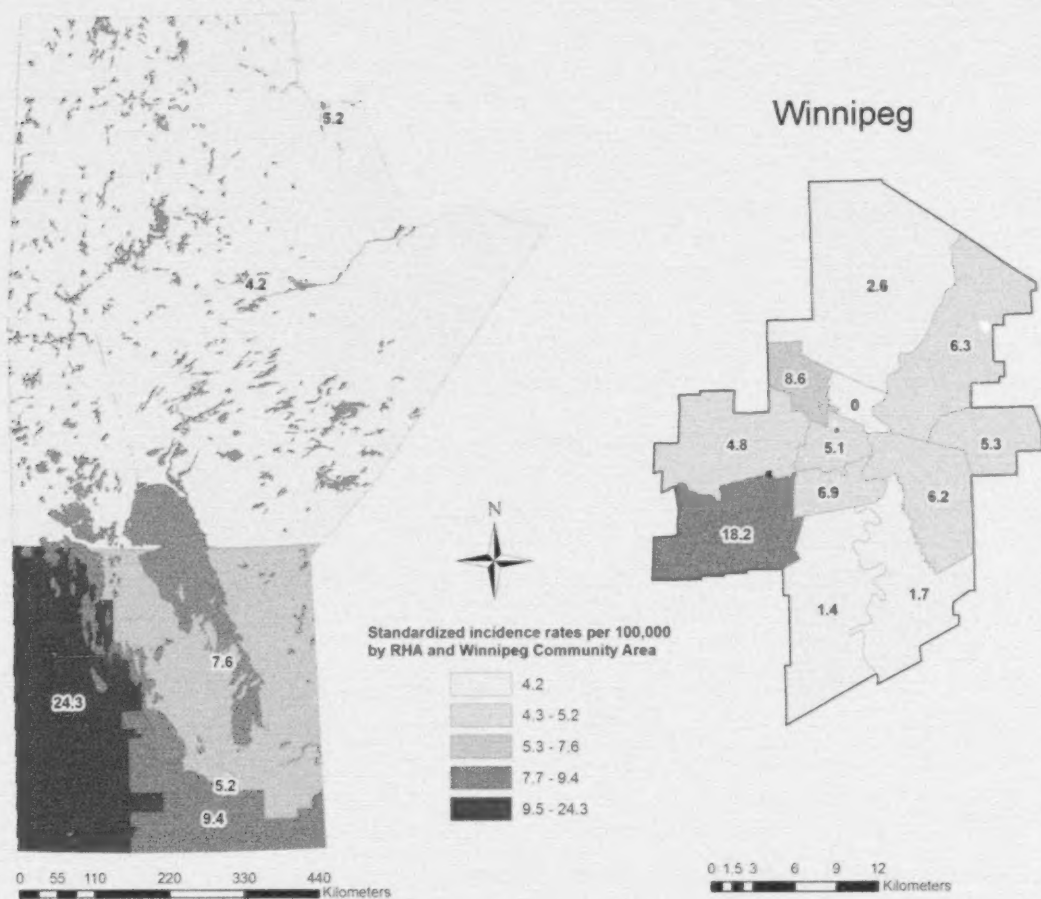
0 37.5 75 150 225 300 Kilometers

Winnipeg

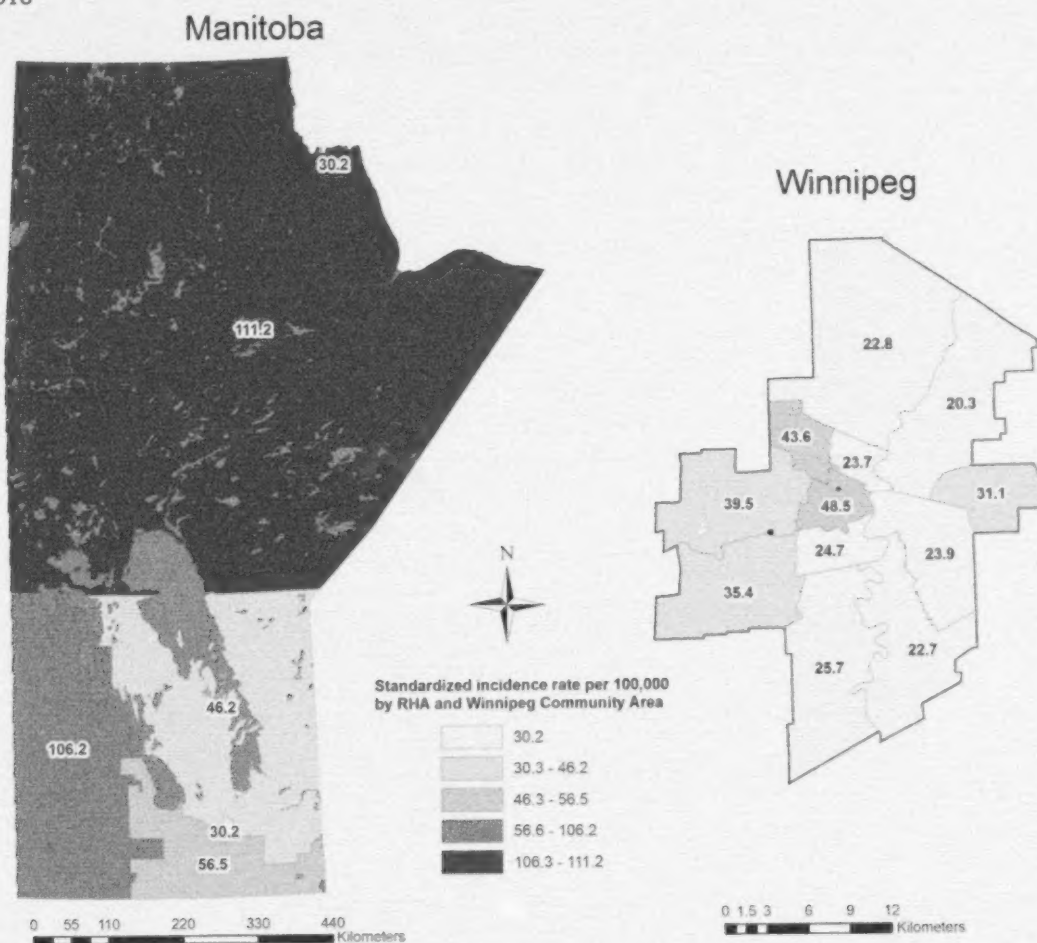


0 1.5 3 6 9 12 Kilometers

Standardized incidence rates of influenza B by RHA and Winnipeg community area, 2012/2013
Manitoba



Standardized incidence rate of all influenza (A and B) by RHA and Winnipeg community area,
2012/2013



APPENDIX C: Incidence rate of influenza A by age group (1999/2000 to 2011/2012)

Age Group:	1999/2000		2000/2001		2001/2002		2002/2003		2003/2004		2004/2005		2005/2006		2006/2007		2007/2008		2008/2009		2010/2011		2011/2012	
	N	Inc.	N	Inc.	N	Inc.	N	Inc.	N	Inc.	N	Inc.	N	Inc.	N	Inc.	N	Inc.	N	Inc.	N	Inc.	N	Inc.
<1	27	187.15	20	142.78	16	114.93	6	43.56	19	135.63	8	57.29	5	34.89	10	67.04	14	90.31	7	44.24	31	194.67	7	44.4
1-4	11	18.20	10	16.86	18	30.86	3	5.19	14	24.29	14	24.51	1	1.76	13	22.64	8	13.56	9	14.82	45	71.57	8	12.3
5-9	1	1.19	2	2.42	1	1.23	1	1.26	10	12.75	2	2.60	3	3.98	1	1.33	9	12.03	2	2.67	27	35.93	5	6.5
10-14	2	2.39	1	1.19	7	8.25	2	2.35	6	6.99	3	3.51	3	3.55	4	4.81	1	1.21	3	3.69	32	39.73	3	3.7
15-19	3	3.70	7	8.55	6	7.26	2	2.42	4	4.77	1	1.18	0	0.00	3	3.47	3	3.44	3	3.40	13	14.69	3	3.4
20-24	7	9.15	3	3.92	0	0.00	1	1.28	9	11.38	4	5.00	1	1.24	1	1.23	6	7.33	4	4.81	18	20.89	2	2.2
25-29	7	9.21	0	0.00	5	6.72	1	1.34	7	9.29	6	7.98	0	0.00	1	1.31	3	3.85	2	2.50	23	28.07	4	4.7
30-39	13	7.55	2	1.19	8	4.87	1	0.62	8	5.07	6	3.87	4	2.61	4	2.61	7	4.52	9	5.75	52	32.93	5	3.1
40-49	9	5.18	5	2.82	8	4.45	1	0.55	4	2.18	7	3.81	6	3.28	4	2.21	7	3.92	5	2.81	42	23.89	7	4.0
50-59	22	17.37	0	0.00	2	1.47	4	2.85	4	2.75	9	5.98	2	1.29	7	4.44	5	3.11	6	3.65	40	23.76	8	4.6
60-69	18	20.97	0	0.00	3	3.45	2	2.26	4	4.40	7	7.52	4	4.18	2	1.98	2	1.89	3	2.71	18	15.59	2	1.7
70-79	25	34.67	0	0.00	7	9.82	5	7.07	14	20.03	10	14.46	7	10.16	4	5.84	3	4.37	6	8.72	33	47.87	2	2.9
>79	102	235.09	1	2.25	20	43.72	11	23.39	48	100.11	76	155.71	29	58.22	17	33.72	11	21.45	27	51.91	100	189.93	10	18.8